



# MONITORING WELL LOG: S-292

Page 1 of 1

PROJECT: Sunoco-Philadelphia Refinery

DRILLING CO.:

Parratt Wolff

SITE LOCATION: AOI-2

DRILLING METHOD:

Hollow Stem Auger

JOB NO.:

SAMPLING METHOD:

Split Spoon

LOGGED BY: JR Williams

SCREEN/RISER DIAMETER:

4"

DATES DRILLED: 6/16/2010

WELLBORE DIAMETER:

6"

TOTAL DEPTH: 20'

ELEVATION:

N/A

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0			No 0'-2' sample - Asphalt	Hand cleared to 8'		
			Cleared to 8' - Fill: 1' thick brick layer under asphalt/subbase; then gray clayey gravel.			
-5					10' PVC Riser	
180			50% recovery - Gray/white/tan, mixed medium sands and some gravel, strong odor		Bentonite 6-8'	
695					Sand 8-20'	
-10			100% recovery - Gray/white/tan, mixed medium sands, strong odor, moist to wet			
629						
556						
962			100% recovery - Same as above, wet			
1087				Hollow stem auger terminal depth = 20'		
902			100% recovery - Same as above			
-15						
1020						
886			100% recovery - Same as above (17') Color change to orange/yellow, some gravels			
730						
915			100% recovery - Same as above			
862						
-20						



# MONITORING WELL LOG: S-294

Page 1 of 2

PROJECT: Sunoco-Philadelphia Refinery  
 SITE LOCATION: AOI-2  
 JOB NO.:  
 LOGGED BY: S. Sykes  
 DATES DRILLED: 5/25/10  
 TOTAL DEPTH: 40'

DRILLING CO.: Parratt Wolff  
 DRILLING METHOD: Hollow Stem Auger  
 SAMPLING METHOD: Split Spoon  
 SCREEN/RISER DIAMETER: 4"  
 WELLBORE DIAMETER: 6"  
 ELEVATION: N/A

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0				Hand cleared to 8'		
			Cleared to 8' - Asphalt, black gravel, cinders and sand to 2.5'			
			2.5'-8' Dark gray clay with sand and gravel		Bentonite 18-19'	
-5						
128			100% recovery - (8') Gray/brown fine silty sand, trace clay, moist (9') Same as above			
30.1						
-10			100% recovery - (10') Same as above (11') Light gray fine sand and clay, tight/compact, moist, no odor		20' PVC Riser	
36.2						
18.7						
2.1			100% recovery - (12') Same as above (13') Gray/brown/black fine sand, trace clay, moist, slight odor			
133						
122			100% recovery - (14') Same as above (15') Same as above			
-15						
36.7						
65.3			100% recovery - (16') Coarse sand and small gravels (red/white/brown) (17') Fine sand, brown/gray			
107						
103			100% recovery - (18') Same as above, yellow/brown (19') Same as above			
181					Sand 19-40'	
-20						



# MONITORING WELL LOG: S-294

Page 2 of 2

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
27.4		□	100% recovery - (20') Same as above (21') Mixed sands and gravels			
84.1		□	(yellow/brown/white/red/green)			
18.9		□	100% recovery - (22') Same as above (23') Light gray mixed sands and gravels			
74.3		□				
12.0		□	100% recovery - (24') Mixed sands and gravels			
-25 24.2		□	(yellow/brown/white/orange) (25') Same as above			
212		□	100% recovery - Same as above			
223		□				
568		□	100% recovery - Same as above			
732		□				
-30 122		□	25% recovery - (30') Brown fine sand, trace silt, wet (31') Same as above		20' PVC Screen	
312		□				
138		□	100% recovery - (32') Same as above (33') Brown sand and gravels, trace silt, wet			
173		□				
213		□	25% recovery - Same as above			
-35 312		□				
789		□	100% recovery - (36') Coarse sand and gravel, black/dark brown, wet, sheen on spoon			
1020		□	(37') Tan/orange fine sand, some clay, very moist			
12.1		□	100% recovery - (38') Tan/orange fine sand and clay, very moist (39') Light brown fine sandy clay, tight, moist			
10.4		□		Hollow stem auger terminal depth = 40'		
-40		□				



# MONITORING WELL LOG: S-294 D

Page 1 of 5

PROJECT:	Sunoco-Philadelphia Refinery	DRILLING CO.:	ECDI
SITE LOCATION:	AOI-2	DRILLING METHOD:	Hollow Stem Auger & Mud Rotary
JOB NO.:		SAMPLING METHOD:	Split Spoon
LOGGED BY:	Tiffani Doerr/Shawn Sikes	SCREEN/RISER DIAMETER:	4-inch
DATES DRILLED:	6/7/10-6/10/10	WELLBORE DIAMETER:	6.25"
TOTAL DEPTH:	99'	ELEVATION:	NA

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0						
-5						
-10	8.3		(BC=5-4-5-7)16" Recovery - SI moist brn and gray mottled sl plastic SILT.			
	7.9					
	31.4		(BC=6-9-9-12)16" Recovery - same as above in top 3", then sl moist gray fine SAND, with strong petroleum odor.			
	153					
	1.2		(BC=7-9-13-11)10" Recovery - same in top 4" - then pinky-gray fine-coarse SAND w/few fine gravels. Dry-loose, slight odor.			
-15	11.2					
	18.4		(BC=6-9-9-8)10 Recovery - SI moist gray silty SAND grading to fine gray sand.			
	1.2					



# MONITORING WELL LOG: S-294 D

Page 2 of 5

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0.2			(BC=6-6-7-6)Fine SAND grading from gray to orange- brn, sl moist.			
0.1						
-20 3.4			(BC=5-7-13-13)Gray & orange layered fine-coarse sand then red-brn silty very fine sand.			
1.2			@ 21' (Trenton) Fine-coarse multicolored SAND w/ fine multicolored GRAVEL. Sub- angular to sub-round.			
0.0			(BC=11-18-23-28)2" Recovery - It brn sandstone gravel and fine sand.			
241			(BC=7-12-13-16)Top 5" gray (stained?) silty clay layer, rest is type Trenton - mostly fine- coarse sand w/fine gravel ~1".			
-25 8.3			(BC=7-12-11-8)Same as above			
23.7						
26.2						
18.7			(BC=12-14-17-17)Same, but less gravel, mostly orange-brn, 3" fine sand layer at 28'.			
21.6						
-30 255			(BC=12-17-20-16)Same as above, saturated,			
159						
355			(BC=12-11-15-14)Coarse SAND with few gravels, loose, oily.			
374						
95.8			(BC=12-15-17-15)Same to 35'. At 35' becomes more dense w/more gravel (up to 1/2"), black-red color.			
-35 206			(BC=10-4-4-3)10" Recovery - Orange-gray layered very fine sand.			
395						
21.8			(BC=5-3-2-2)14" Recovery - Same as above with increased clay content near bottom (38').			
25.9						
-40						



# MONITORING WELL LOG: S-294 D

Page 3 of 5

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
18.6			(BC=3-2-4-6)Top 2" same. Rest is dark gray CLAYEY SILT w/some fine sand, sl micaceous.			
12.2			(BC=6-3-4-4)No recovery.			
2.5			(BC=1-2-2-4)Dark gray SILTY CLAY.			
-45 1.7			(BC=1-3-2-2)No recovery.			
1.8			(BC=2-4-5-6)6" Recovery - same as above			
-50 0.0			(BC=2-3-5-6)Red-brn very fine sand in top 4", grades to red-brn CLAY w/trace organics.			
0.0			(BC=2-3-4-4)Same as above - Clay with trace organics, sl micaceous			
0.0			(BC=5-10-12-11)Same grades into sandy clay. At 55.5' transition into med-coarse sand with trace fine gravel, same red- brn color. (red-brn from fines - washed sands are multi- colored).			
-55 0.0			(BC=8-6-5-5)Same as above - red-brn med-coarse SAND w/ few gravels, clayey from 57'-58'.			
0.0			(BC=6-7-7-12)Same as above with less gravel, clayey sand.			
0.0						
-60 0.0						



# MONITORING WELL LOG: S-294 D

Page 4 of 5

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
-65			Cuttings: same as above.			
-70			Cuttings: Med-coarse sand w/ few fine gravels.			
-75			Cuttings: Med-coarse sand w/ few fine gravels.			
-80			Cuttings: Med-coarse sand with few gravels and some mica flakes.		#1 Sand (82'-99')  #00 Sand (80'-82')  Screen (84'-99')	



# MONITORING WELL LOG: S-294 D

Page 5 of 5

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
-85			Cuttings: Med-coarse sand w/ few fine gravels.			
-90			Cuttings: Greenish gray Clayey Sand.	Mud rotary terminal depth = 105'		
			According to driller, tough drilling gravel layer from 92' to 95'.			
-95			Cuttings: Sand and gravel.			
-100			Cuttings: Med-coarse sand with few gravels and some mica flakes			
-105			Encountered weathered bedrock.			



# MONITORING WELL LOG: S-295

Page 1 of 2

PROJECT: Sunoco-Philadelphia Refinery  
 SITE LOCATION: AOI-2  
 JOB NO.:  
 LOGGED BY: JR Williams  
 DATES DRILLED: 6/8/2010  
 TOTAL DEPTH: 24'

DRILLING CO.: Parrat Wolffe, Inc  
 DRILLING METHOD: Hollow Stem Auger  
 SAMPLING METHOD: Split Spoon  
 SCREEN/RISER DIAMETER: 4-inch  
 WELLBORE DIAMETER: 6.25"  
 ELEVATION: NA

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0			No surface sample - asphalt.			
			Cleared to 8' - fill: black sandy gravel and large fill (wood, abandoned piping, concrete block). Water at 7' during clearing.		Bentonite (2'-5')	
				Hand cleared to 8'		
-5					Sand (5'-24')	
73.2			Grayish brown silty sand with layers of black sand, fine grained, moist, odor			
140			Same as above		Screen (9'-24')	
-10			Same as above			
97.3						
1.6			Brown sand with areas of orange throughout, fine grained, micaceous, dry, odor			
224			Brownish black sand, fine grained, micaceous, moist, odor			
58.6			Brown sand compacted, fine grained, dry, odor			



# MONITORING WELL LOG: S-295

Page 2 of 2

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
-15	71.4		Same as above			
	97.7		Brown sand, medium grained, sample grain size increasing with depth, fine gravel at 16', wet, odor			
	164		Brown sand with small gravel, coarse grained, micaceous, wet, odor			
	93.0		Brown sand with small gravel, medium grained, micaceous, moist, odor			
	304		Brown medium grained sand with fine to coarse gravel, moist, odor			
	142		Brown sand with medium gravel, coarse grained, wet, odor			
-20	197		Same as above, multi-colored gravels			
	149		Same as above			
	134		Brown sand, medium grained, micaceous, wet, odor			
	1036		Brown sand with small gravel, coarse grained, wet, odor	Hollow stem auger terminal depth = 25'		
-25						



# MONITORING WELL LOG: S-297

Page 1 of 2

PROJECT: Sunoco-Philadelphia Refinery  
 SITE LOCATION: AOI-2  
 JOB NO.:  
 LOGGED BY: JR Williams  
 DATES DRILLED: 5/4/2010  
 TOTAL DEPTH: 35'

DRILLING CO.: Parratt Wolff  
 DRILLING METHOD: Hollow Stem Auger  
 SAMPLING METHOD: Split Spoon  
 SCREEN/RISER DIAMETER: 4-inch  
 WELLBORE DIAMETER: 6.25"  
 ELEVATION: NA

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0.0		80% Recovery - Brown sandy silt with small amount of gravel, medium grained, dry, no odor	Sample (1'-2') submitted to the laboratory for analysis			
0.0		Cleared to 8' - Fill: dark gray sandy silt with gravel.				
-5				Hand cleared to 8'		
0.0		20% Recovery - Brown sandy silt with gravel, moist, no odor				
0.0		Light gray sand with gravel, dry, no odor				
-10		20% Recovery - Light gray sand with large gravel, dry, no odor				
0.0		70% Recovery - same as above to 13'				
3.5		Light gray sand with large gravel, dry, odor				
-15		No recovery in 14' and 16' spoon samples				
					Bentonite (15'-17')	
					Sand (17'-35')	



# MONITORING WELL LOG: S-297

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
10.5			20% Recovery - Light gray sand, fine grained, dry, no odor			
10.5						
-20 8.0			20% Recovery - Brown silty clay, fine grained, dry, no odor			
12.6			Brown silty clay with small gravel, moist, no odor		Screen (20'-35')	
780			100% Recovery - Dark brown sand, coarse grained, wet, odor			
68.5			Black stained sand, coarse grained, wet, odor			
130			100% Recovery - same as above			
-25 156						
86			100% Recovery - Black stained sand with gravel, wet, odor			
116			Black stained sand with large gravel, wet, odor			
110			100% Recovery - same as above to 31'			
120						
-30 11.6						
9.1			50% Recovery - Grayish red sandy clay, wet, odor			
7.1			40% Recovery in 32' and 34' spoons - same as above			
11.3						
11.5				Hollow stem auger terminal depth = 36'		
-35 11.5						



# MONITORING WELL LOG: S-298

Page 1 of 1

PROJECT: Sunoco-Philadelphia Refinery

DRILLING CO.:

Parratt Wolff

SITE LOCATION: AOI-2

DRILLING METHOD:

Hollow Stem Auger

JOB NO.:

SAMPLING METHOD:

Split Spoon

LOGGED BY: S. Sykes

SCREEN/RISER DIAMETER:

4"

DATES DRILLED: 5/24/2010

WELLBORE DIAMETER:

6"

TOTAL DEPTH: 20'

ELEVATION:

N/A

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
1306			100% recovery - Gravel, brick, brown/gray sandy silt, dry, odor	Hand cleared to 8'		
1309			Cleared to 8' - Fill: dark gray/brown silt and sand with gravel, brick.	Sample collected from (1'-2') submitted to the laboratory for analysis	Bentonite 3-4'	
-5					Sand 4-20'	
					5' PVC Riser	
1020			100% recovery - (8') Black sand and clay, coarse, wet, odor, sheen on spoon (9') Black sandy clay and some gravel, wet, odor, sheen on spoon			
1130			75% recovery - (10') Black/dark gray sandy clay, wet, sheen on spoon (11') Same as above			
-10						
124			100% recovery - (12') Same as above, wood/organic matter (12.5') Fine sand and coarse gravel, white/red/tan (13') Dark brown/black sandy silt, moist			
117			100% recovery - Black/dark gray coarse sand, trace silt and gravel, strong odor, wet			
674						
-15						
699					15' PVC Screen	
989			100% recovery - Balck/dark gray coarse sand and red gravels, trace clay, wet, strong odor			
12224						
976			50% recovery - Same as above			
1002				Hollow stem auger terminal depth = 20'		
-20						





# MONITORING WELL LOG: S-299

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
-15	79.5	⊠ ⊠ ⊠ ⊠	Brown sand with small to medium sized gravel, fine grained, micaceous, moist, odor			⋮
158		⊠ ⊠ ⊠ ⊠	70% Recovery - Brown sand with layering of light brown sand, fine grained, micaceous, wet, odor			⋮
466		⊠ ⊠ ⊠ ⊠	Brown sand with small gravel, medium grained, micaceous, wet, odor			⋮
244		⊠ ⊠ ⊠ ⊠	80% Recovery - Brown sand with small gravel, medium grained, micaceous, wet, odor, SPH sheen present			⋮
129		⊠ ⊠ ⊠ ⊠	Same as above			⋮
84.8		⊠ ⊠ ⊠ ⊠	100% Recovery - Brown sand, fine grained, micaceous, wet, odor			⋮
264		⊠ ⊠ ⊠ ⊠	Multi colored sand with small to large gravel, coarse grained, wet, odor			⋮
-20	32.8	⊠ ⊠ ⊠ ⊠	30% Recovery - Brown sand with black staining, fine grained, micaceous, wet, odor, SPH sheen present			⋮
88.1		⊠ ⊠ ⊠ ⊠	Brown sand with black staining and small gravel, medium grained, wet, odor, SPH sheen present			⋮
38.6		⊠ ⊠ ⊠ ⊠	80% Recovery - Same as above			⋮
107		⊠ ⊠ ⊠ ⊠	Black stained sand with small to medium gravel, medium to coarse grained, wet, odor, SPH sheen present			⋮
89.6		⊠ ⊠ ⊠ ⊠	60% Recovery - same as above	Hollow stem auger terminal depth = 25'		⋮
-25		⊠ ⊠ ⊠ ⊠				⋮



# MONITORING WELL LOG: S-300

PROJECT: Sunoco-Philadelphia Refinery

DRILLING CO.:

Parratt Wolff

SITE LOCATION: AOI-2

DRILLING METHOD:

Hollow Stem Auger

JOB NO.:

SAMPLING METHOD:

Split Spoon

LOGGED BY: JR Williams

SCREEN/RISER DIAMETER:

4"

DATES DRILLED: 5/19/2010

WELLBORE DIAMETER:

6"

TOTAL DEPTH: 30'

ELEVATION:

N/A

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0.0			70% Recovery - Black stained, silty sand with gravel, shards of mica throughout, dry, odor	Hand cleared to 8'		
0.0			Cleared to 8' - at 2' is old brick floor, beneath is fill material - brown sandy clay with gravel.			
-5					17' PVC Riser	
0.0			80% recovery - Fill gravel from clearing, wet (9') Brown, silty clay with areas of gray throughout, fine grain, moist, odor		Bentonite 10-12'	
0.0					Sand 12-30'	
-10			30% recovery - Light gray, silty clay, fine grained, moist, slight odor			
0.0						
0.0			70% recovery - Same as above (13') Red silty clay, dry, fine grained, odor			
0.0						
0.0			100% recovery - Light red, silty clay, areas of light gray throughout, moist, odor (15') Same as above, gray			
-15						
0.0			100% recovery - Light gray, silty clay with stains of red throughout, moist, odor (17') Brown, silty clay with small gravel at bottom, moist, odor			
0.0						
0.0			Recovery - Light gray, silty clay with light red stains throughout, moist, odor (19') Brownish gray			
0.0						
-20						





# MONITORING WELL LOG: S-301

PROJECT: Sunoco-Philadelphia Refinery

DRILLING CO.:

Parrat Wolfe, Inc

SITE LOCATION: AOI-2

DRILLING METHOD:

Hollow Stem Auger

JOB NO.:

SAMPLING METHOD:

Split Spoon

LOGGED BY: JR Williams

SCREEN/RISER DIAMETER:

4-inch

DATES DRILLED: 6/8/2010

WELLBORE DIAMETER:

6.25"

TOTAL DEPTH: 28'

ELEVATION:

NA

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0			Asphalt - no surface sample collected			
			Cleared to 8' - Black gravel and sand to 8'. Water at 5' during clearing.			
				Hand cleared to 8'		
-5					Bentonite (5'-10')	
0.0			60% Recovery - Brown silty sand with areas gray throughout, fine grained, moist, odor			
0.0			Same as above			
-10			60% Recovery - Orange red silty sand with areas of gray throughout, micaceous, fine grained, moist, no odor			
0.0			Same as above			
0.0			100% Recovery - Same as above			



# MONITORING WELL LOG: S-301

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0.0			Dark brown silty sand, fine grained, micaceous, moist, no odor		Screen (13'-28')	
0.0			70% Recovery - Dark brown silty clay with organics throughout, micaceous, moist, no odor			
-15 0.0			Gray silty clay with organics throughout, fine grained, micaceous, moist, no odor			
0.0			80% Recovery - Same as above			
0.0			Same as above			
0.0			90% Recovery - Dark brown sand with organics throughout, fine grained, moist, no odor			
0.0			Gray sand with small gravel, medium grained, moist, odor			
-20 56.3			40% Recovery - Grayish red sand with small gravel, coarse grained, moist, odor			
73.9			Same as above			
33.0			60% Recovery - Brown sand with small to medium gravel, grain size increasing with depth from med to coarse, wet, odor			
16.8			Brown sand, fine grained, micaceous, moist, odor			
0.0			70% Recovery - Gray sand with areas of brown throughout, wet, odor			
-25 0.1			Same as above			
8.3			80% Recovery - Same as above			
68.7			Brown sand with few medium gravel throughout, medium grained, wet, odor	Hollow stem auger terminal depth = 28'		



# MONITORING WELL LOG: S-302

PROJECT: Sunoco-Philadelphia Refinery

DRILLING CO.:

Parratt Wolff

SITE LOCATION: AOI-2

DRILLING METHOD:

Hollow Stem Auger

JOB NO.:

SAMPLING METHOD:

Split Spoon

LOGGED BY: JR Williams

SCREEN/RISER DIAMETER:

4-inch

DATES DRILLED: 4/21/10-

WELLBORE DIAMETER:

6.25"

TOTAL DEPTH: 30'

ELEVATION:

NA

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0						
4.3			90% Recovery - Brown sand with small amount of gravel, medium grained, dry, no odor	Hand cleared to 8'		
8.2			Black and brown silty sand, compacted, dry, no odor	Sample (1'-2') submitted to the laboratory for analysis		
			Cleared to 8' - Dry, gray clay and gravel with no debris, staining or odors.			
-5						
7.4			70% Recovery - Brown sandy clay with black stains throughout, medium to fine grained, wet, odor			
6.8			Black medium sand, wet, odor with large gravel			
-10			70% Recovery - Brown fine grained sandy clay, wet, odor		Bentonite (10'-13')	
4.8			Same as above			
6.3						
63.1			70% Recovery - Brown medium sand, wet with odor, coarseness increasing with depth			



# MONITORING WELL LOG: S-302

Page 2 of 2

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
112			50% Recovery - Brown medium grained sand with poorly sorted gravel, wet, odor			
-15			Same as above		Sand (13'-30')	
58.6			70% Recovery - Brown coarse sand with medium gravel, wet, odor			
			Same as above			
360			50% Recovery - Same as above			
			Brown coarse sand with medium to large gravel, wet, odor, gravel size increasing with depth			
-20			50% Recovery - Black medium to coarse sand and gravel, poorly sorted, wet, sheen noted, strong odor		Screen (15'-30')	
			Same as above			
1802			100% Recovery - Same as above			
71.2			70% Recovery - Brown coarse sand and gravel, wet odor, sheen noted			
-25			Brown medium sand and gravel, wet, sheen noted, odor			
340			100% Recovery - Coarse sand and gravel, wet, odor, sheen noted			
			Same as above			
565			100% Recovery - Same as above			
			Green medium sand compact, wet, odor	Hollow stem auger terminal depth = 30'		
-30						



# MONITORING WELL LOG: S-302 D

Page 1 of 4

PROJECT:	Sunoco-Philadelphia Refinery	DRILLING CO.:	ECDI
SITE LOCATION:	AOI-2	DRILLING METHOD:	Hollow Stem Auger & Mud Rotary
JOB NO.:		SAMPLING METHOD:	Split Spoon
LOGGED BY:	Tiffani Doerr	SCREEN/RISER DIAMETER:	4-inch
DATES DRILLED:	5/6/10-5/7/10	WELLBORE DIAMETER:	6.25"
TOTAL DEPTH:	92'	ELEVATION:	NA

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0						
-5						
-10	400		(BC=2-3-3-5) Medium brown, moist silty sand grades into sand at bottom. Odors at 10'.	Hand cleared to 8'	Grout/bentonite slurry (0'-75')	
0.0			(BC=5-7-4-4) No recovery			
-15	0.0		(BC=12-21-26-26) Trenton gravel, medium, dense, moist. Subangular/subrounded gravels and coarse sand, poorly graded		#1 Sand (75'-92')	
0.0			(BC=7-22-17-19) Same as above, coarser sand. Quartz and quartzite, siltstone gravels, wet.			
0.0			(BC=20-17-19-19) Saturated sand and gravels, strong odor			
367						
-20	466		(BC=12-17-20-21) Larger gravels up to 2 inch. Medium sand at 22.5'. Black petrol staining		Screen (77'-92')	
622						



# MONITORING WELL LOG: S-302 D

Page 2 of 4

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
-			(BC=19-15-12-14) No recovery			
-			(BC=10-12-21-25) No recovery			
-25						
0.0			(BC=31-20-19-17) Same gravel and sand. Little clay and silt where very degraded mudstone/siltstone, cobbles.			
0.0						
0.0			(BC=12-28-31-30) Silty sand, medium grained with some gravels. Micaceous gray/black fine sands, decomposed schist from 28'-29.5'.			
-30			(BC=9-8-26-26) Mostly gray-yellow brown, coarse sand with few rounded fine gravel. Sand in bottom 2 inches of spoon.			
0.0			(BC=10-4-2-5) Gray-orange finely laminated clay, medium stiffness, few areas of fine sand, wet			
0.0						
0.0			(BC=4-6-8-5) Dark gray stiff clay, very little organics			
-35						
0.0			(BC=2-2-2-3) Same as above			
0.0						
0.0			(BC=4-4-4-5) Gray, loose fine sand with little silt			
-40						
0.0			(BC=7-7-8-8) Grayish, red-brown silty fine sand, no gravel, with little clay, slightly micaceous.			
0.0			(BC=5-8-7-7) Same as above			
0.0						
0.0			(BC=4-5-7-9) Same as above, grading into fine sandy clay with silt			
-45						
0.0						



# MONITORING WELL LOG: S-302 D

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
-50	0.0		(BC=2-4-6-4) Silty fine sand with little clay			
	0.0					
-55	0.0		(BC=4-5-5-7) Red-brown alternating layers of slightly plastic, very fine sandy silt and very fine sandy clay, slightly micaceous, moist, few thin layers of fine sand			
	0.0					
-60	0.0		(BC=4-5-5-5) Reddish brown clay, slightly micaceous, no sand			
	0.0					
-65	0.0		(BC=10-12-12-9) Medium sand with trace of medium gravel			
	0.0					
-70	0.0		(BC=27-24-16-13) Medium to coarse fine sands with coarse gravel, poorly sorted, large gravels are rounded quartzite			
	0.0					
					#00 Sand (73'-75')	



# MONITORING WELL LOG: S-302 D

Page 4 of 4

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
-75	0.0		(BC=21-18-18-20) Broken gravel, Light gray and purple quartzite, white quartz gravel, few red-brown fines.			
0.0	0.0					
-80			(BC=17-21-18-19) Gray, medium coarse sands and fine-medium gravels, few red-brown fines.			
-85						
-90			(BC=5-6-6-7) Dark gray silty clay with thin gray fine sand layers approx 2 inches apart.	Mud rotary terminal depth = 92'		
			(BC=70/6',200/2") Weathered wissahickon schist			



# MONITORING WELL LOG: S-303

Page 1 of 2

PROJECT: Sunoco-Philadelphia Refinery

DRILLING CO.:

Parratt Wolff

SITE LOCATION: AOI-2

DRILLING METHOD:

Hollow Stem Auger

JOB NO.:

SAMPLING METHOD:

Split Spoon Sample

LOGGED BY: Shaun Sykes

SCREEN/RISER DIAMETER:

4"

DATES DRILLED: 5/21/2010

WELLBORE DIAMETER:

6"

TOTAL DEPTH: 26'

ELEVATION:

N/A

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0				Hand cleared to 8'		
65.6			80% recovery - Black, silty sand, fine grained, stained, large gravel mixed throughout, micaceous, heavy odor, moist, to dry			
519						
-5					Riser 0'-11'	
2.4			30% recovery - Brown, fine silty sand, staining throughout, heavy odor, moist, spoon had shards of wood in it		Sand 9'-26'	
2.6						
-10			100% recovery - Brown, fine sandy silt, moist, odor, micaceous (11') Fine sand, some areas of black staining, SPH sheen			
9.5						
68.7						
20.4			100% recovery - Same as above (13') Brown, medium sand, micaceous, moist, odor, black staining, SPH sheen		Screen 11'-26'	
21.8						
62.6			50% recovery - Brown, medium sand with small gravel, moist, odor, SPH sheen, micaceous (15') black			
-15						
100						
84.8			Recovery - Black, coarse sand			



# MONITORING WELL LOG: S-303

Page 2 of 2

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
91.2			with small to medium gravel ranging in color, micaceous, moist, odor, SPH sheen (17') Brown, coarse sand with small to large gravel ranging in color, some SPH staining, moist, odor, micaceous 0% recovery			
-20	700+		25% recovery - Med brown medium sand and gravel, trace silt, wet, odor.  10% recovery - Same as above w/large gravel, wet, odor.			
-25			Same as above.	Hollow stem auger terminal depth = 26'		



# MONITORING WELL LOG: S-304

Page 1 of 1

PROJECT: Sunoco-Philadelphia Refinery  
 SITE LOCATION: AOI-2  
 JOB NO.:  
 LOGGED BY: S. Sykes  
 DATES DRILLED: 6/4/10  
 TOTAL DEPTH: 18'

DRILLING CO.: Parrat Wolff, Inc  
 DRILLING METHOD: Hollow Stem Auger  
 SAMPLING METHOD: Split Spoon  
 SCREEN/RISER DIAMETER: 4"  
 WELLBORE DIAMETER: 6"  
 ELEVATION: N/A

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0				Hand cleared to 8'		
-5			Asphalt at surface - cleared to 8': dark gray, dry, gravel and sand with wood.		8' PVC Riser	
63.3			100% recovery - (8') Gray fine silty sand, moist, odor (9') Dark gray/brown fine sand, trace silt, very moist, strong odor		Bentonite 6-7'	
212					Sand 7-18'	
-10			100% recovery - Dark brown sand and some gravels, very moist/wet, strong odor			
262						
293						
335			100% recovery - (12') Same as above (13') Black sand and gravels, wet, strong odor		10' PVC Screen	
315						
24.6			100% recovery - (14') Dark gray fine sand and gravel, wet (15') Light gray fine sandy clay, very moist			
-15						
12.2						
5.3			100% recovery - (16') Same as above (17') Dark brown fine sandy clay, moist			
3.6				Hollow stem auger terminal depth = 18'		



# MONITORING WELL LOG: S-305

PROJECT: Sunoco-Philadelphia Refinery

DRILLING CO.:

Parratt Wolff

SITE LOCATION: AOI-2

DRILLING METHOD:

Hollow Stem Auger

JOB NO.:

SAMPLING METHOD:

Split Spoon

LOGGED BY: JR Williams

SCREEN/RISER DIAMETER:

4"

DATES DRILLED: 5/19/2010

WELLBORE DIAMETER:

6"

TOTAL DEPTH: 29'

ELEVATION:

N/A

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0				Hand cleared to 8'		
8.4			100% Recovery - Brown silty fine sand, black staining, dry, odor, large gravel			
0.4			Cleared to 8' - fill: gravel, dark gray silt and sand.			
-5					17' PVC Riser	
34.0			70% recovery - Brown, silty clay, black staining, moist, odor, small gravel near bottom of spoon		Bentonite 10-12'	
25.2					Sand 12-29'	
-10			20% recovery - Grayish brown, medium sand with large gravel, wet, odor			
72.2						
81.3						
111			100% recovery - Grayish brown, medium to coarse sand with small to large gravel, wet, odor			
76.0			(13') Brown, fine silty clay, with areas of gray throughout, hard compacted, moist, odor			
16.6			80% recovery - Light gray,			



# MONITORING WELL LOG: S-305

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
-15	10.4	⊠ ⊠ ⊠ ⊠	clayey sand, moist, odor, sand is fine, soil is compacted			
3.8		⊠ ⊠ ⊠ ⊠	70% recovery - Same as above, wet			
3.7		⊠ ⊠ ⊠ ⊠				
0.8		⊠ ⊠ ⊠ ⊠	60% recovery - Same as above (19') Grayish brown, coarse sand with medium gravel, gravel is an array of colors, clay mixed throughout sand, odor, wet			
8.6		⊠ ⊠ ⊠ ⊠				
-20	9.1	⊠ ⊠ ⊠ ⊠	80% recovery - Same as above (21') 6" layer of red medium sand with large gravel, odor, Bottom of spoon green coarse sand with small to large gravel coarsing downward, odor, wet to moist, micaceous		15' PVC Screen	
64.8		⊠ ⊠ ⊠ ⊠				
37.2		⊠ ⊠ ⊠ ⊠	100% recovery - Green, coarse sand with small to medium gravel, wet, odor, micaceous			
65.4		⊠ ⊠ ⊠ ⊠	(23') Redish brown, coarse sand with small to medium gravel, wet, odor, micaceous			
39.4		⊠ ⊠ ⊠ ⊠	40% recovery - Same as above, SPH sheen, hit water	Hollow stem auger terminal depth = 32'		
-25	101	⊠ ⊠ ⊠ ⊠				
38.2		⊠ ⊠ ⊠ ⊠	40% recovery - Brown, coarse sand with small to medium gravel, coarsing downward, wet, odor (27') Brown, coarse sand with small gravel, gravel ranging in color			
399		⊠ ⊠ ⊠ ⊠				
132		⊠ ⊠ ⊠ ⊠	50% recovery - Same as above			
279		⊠ ⊠ ⊠ ⊠				
-30	16.8	⊠ ⊠ ⊠ ⊠	70% recovery - Brown, coarse sand, grains multi-colored, wet, odor, micaceous (31') Same as above, with small gravel ranging in color, coarsing downward			
5.5		⊠ ⊠ ⊠ ⊠				



# MONITORING WELL LOG: S-305 D

PROJECT:	Sunoco-Philadelphia Refinery	DRILLING CO.:	ECDI
SITE LOCATION:	AOI-2	DRILLING METHOD:	Hollow Stem Auger & Mud Rotary
JOB NO.:		SAMPLING METHOD:	Split Spoon
LOGGED BY:	Tiffani Doerr	SCREEN/RISER DIAMETER:	4-inch
DATES DRILLED:	5/25/10-6/4/10	WELLBORE DIAMETER:	6.25"
TOTAL DEPTH:	82'	ELEVATION:	NA

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0						
			Cleared to 8' - Fill material: dark gray, silt and sand with gravel and debris.	Hand cleared to 8'		
-5						
-10	3.1		(BC=14-7-7-5) 12" Recovery. Moist, fine SAND (gray then lt brown) with silt. Few sub-angular gravels. Very slight odor.	Full Recovery in spoons unless otherwise noted.	Grout/bentonite slurry (0'-63')	
	2.0					
	0.0		(BC=9-9-10-13) 18" Recovery. Top 3" clayey fine sand w/ few fine gravels. 12'3"-14' moist, lt brown, dense silty CLAY w/few sands and some orange mottling.			
	0.0					
	0.2		(BC=10-12-18-18) Light gray CLAY with little orange mottling.			
-15	0.2					
	0.0		(BC=9-10-17-17) 18" Recovery. Gray & orange mottled CLAY.			



# MONITORING WELL LOG: S-305 D

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0.0			At 19'2" fine gravels are present (sub-round, multi-colored quartz).			
-20			(BC=5-8-11-11) 16" Recovery - same as above with more and larger gravel (up to 1/2") and sand. Last 2" medium gray sand.			
30.1			(BC=11-16-16-15) 14" Recovery. Gray SAND & GRAVEL (clay remains in top 4"). Sand is med-coarse w/ fine-med gravels - gray and red-brn, poorly sorted, slight odors.			
102			(BC=8-7-8-9) 10" Recovery. Reddish-gray reddish gray-brown medium-coarse SAND with few fine gravels. Strong petroleum odor.			
175			(BC=6-12-15-16) Same as above.			
221			(BC=11-24-83-20) 1" Recovery - fragments of larger quartzite gravel in spoon.			
-25			(BC=10-36-24-17) 2" Recovery - Red-brown sand & lg gravel w/ little clay.			
157			(BC=19-24-26-21) 10" Recovery - top 2" red-brown poorly sorted sand and gravel; rest red-brown fine-med SAND with some fine gravel.			
-30			(BC=10-16-17-13) No Recovery - lg quartzite frag in tip of spoon.			
5.2			(BC=4-6-9-6) Moist, dark gray silty CLAY w/ 2 ~3" layers of light gray very fine sand, trace organics.			
4.5			(BC=1-1-2-2) Dark gray silty CLAY with light gray very fine sand layers <1" thick every few			
0.0						
-35						
0.0						
0.0						



# MONITORING WELL LOG: S-305 D

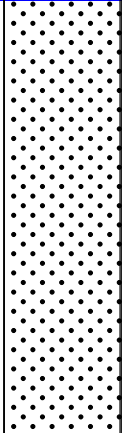
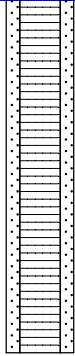
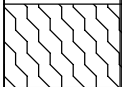
Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0.0			inches.			
0.0			(BC=4-3-3-3) Same with trace fine sands.			
0.0						
-40 0.0			(BC=3-4-3-3) Same - few laminations of fine light gray sands.			
0.0						
0.0			(BC=3-4-3-5) Same as above			
0.0						
0.0			(BC=2-3-3-4) Same as above			
-45 0.0						
0.0			(BC=3-4-4-5) Same as above			
0.0						
0.0			(BC=5-5-5-8) Same with more fine sand - sandy clay.			
0.0						
-50 0.0			(BC=4-3-3-7) Same as above			
0.0						
0.0			(BC=6-7-7-9) Transition to dark gray fine SAND w/ few clay lenses.			
0.0						
0.0			(BC=6-10-14-18) No recovery - quartzite gravel in tip of spoon.			
-55 0.0						
0.0			(BC=35-24-29-34) 6" Recovery. Orange-brn med SAND with gravel in top 2".			





# MONITORING WELL LOG: S-305 D

Page 5 of 5

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
-80			Same as above  Bedrock encountered at 83' - spoon attempted, but no recovery, but cuttings returning lg mica flakes and black crystals (tourmaline?)			
						



# MONITORING WELL LOG: S-306

PROJECT: Sunoco-Philadelphia Refinery  
 SITE LOCATION: AOI-2  
 JOB NO.:  
 LOGGED BY: JR Williams  
 DATES DRILLED: 5/20/2010  
 TOTAL DEPTH: 30'

DRILLING CO.: Parratt Wolff  
 DRILLING METHOD: Hollow Stem Auger  
 SAMPLING METHOD: Split Spoon  
 SCREEN/RISER DIAMETER: 4"  
 WELLBORE DIAMETER: 6"  
 ELEVATION: N/A

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0				Hand cleared to 8'		
1.6			80% Recovery - Brown, fine sandy silt, black staining throughout, shards of brick, micaceous, dry, odor			
1.7						
-5			Gravel, rocks (fill), dark brown, sand, silt		17' PVC Riser	
0.9			80% recovery - Brown, silty clay, micaceous, moist, no odor, fine grain		Bentonite 10-12'	
0.0					Sand 12-30'	
-10			50% recovery - Brown, fine sandy silt, moist, micaceous, no odor (11') medium sand with small gravel, coarsing downward			
0.0			70% recovery - Brown, medium to coarse sand, micaceous, small to medium gravel, moist, slight odor (13') medium sand with mica throughout			
0.0						
0.0						
0.0						



# MONITORING WELL LOG: S-306

Page 2 of 2

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
-			10% recovery - Coarse sand with large gravel, moist, slight odor			
-15						
127			70% recovery - Light brown, coarse sand with small to medium gravel ranging in color, micaceous, odor, moist (17')			
584			Medium to coarse sand			
263			60% recovery - Brown, medium to coarse sand with medium gravel ranging in color, wet, odor, micaceous, shards of mica			
1136						
-20			40% recovery - Brown coarse sand with large gravel, coarsing downward, set, odor, SPH sheen, heavy odor		15' PVC Screen	
519						
391						
40.1			60% recovery - Brown, coarse sand with small to medium gravel, coarsing downward, micaceous, wet, odor, gravel size increases downward (23')			
9.2			Medium sand with grains ranging in color			
60.8			80% recovery - Brown, medium to coarse sand with small gravel, ranging in color, micaceous, wet, odor (25')	Hollow stem auger terminal depth = 30'		
-25			medium sand			
179						
90.2			100% recovery - Brown, medium sand with few medium gravel, micaceous, wet, odor (27')			
26.3			Medium sand with few small gravel to bottom of spoon, areas of red and green compacted sand at bottom of spoon			
0.0			100% recovery - Light red clay with layers of light gray clay, moist, slight odor, mica present (29')			
0.2			Dark brown, clay silt with organics present, moist, slight odor present			
-30						



# MONITORING WELL LOG: S-307

Page 1 of 2

PROJECT: Sunoco-Philadelphia Refinery  
 SITE LOCATION: AOI-2  
 JOB NO.:  
 LOGGED BY: JR Williams  
 DATES DRILLED: 6/10/2010  
 TOTAL DEPTH: 26'

DRILLING CO.: Parratt Wolff  
 DRILLING METHOD: Hollow Stem Auger  
 SAMPLING METHOD: Split Spoon  
 SCREEN/RISER DIAMETER: 4-inch  
 WELLBORE DIAMETER: 6.25"  
 ELEVATION: NA

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0.0			Brown sand with small gravel, fine grained, micaceous, dry, no odor	Sample (0'-2') submitted to the laboratory for analysis		
0.0			Brown sand with black staining, micaceous, dry, no odor			
0.0			Cleared to 8' - no description.			
-5				Hand cleared to 8'	Bentonite (5'-7.5')	
0.0						
0.0					Sand (7.5'-26')	
0.0						
-10					Screen (11'-26')	
0.0			70% Recovery - Brown silty sand with black staining, micaceous, wet, odor			
0.0			Same as above			
0.0			100% Recovery - Brown sand with small gravel, coarse grained, micaceous, wet, no odor			
0.0			Brown sand, fine grained, micaceous, moist, odor, black staining at bottom of spoon			
0.0			60% Recovery - Brown sand, medium grained, micaceous, wet, no odor, grain size increasing with depth			



# MONITORING WELL LOG: S-307

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0.0			Brown sand with small gravel, coarse grained, micaceous, wet, no odor			
0.7			50% Recovery - Brown sand with black staining, fine grained, micaceous, wet, odor			
-15 32.6			Brown sand with large gravel, medium grained, wet, odor			
326			100% - Redish brown sand, fine to medium grained, micaceous, wet, odor			
111			Same as above			
40.7			100% - Brown sand, medium grained, micaceous, wet, odor			
66.2			Brown sand with medium gravel ranging in color, medium grained, wet, odor, green layer of sand at bottom of spoon			
-20 21.2			40% Recovery - Red sand with small gravel, fine grained, wet odor			
0.9			Orange sand with layers of light gray, fine grained, micaceous, moist, odor			
20.8			100% Recovery - Brown sand with medium gravel, medium to coarse grained, micaceous, wet, odor, SPH sheen present			
2.5			Light brown sand, fine grained, wet, odor, SPH sheen present			
0.8			70% Recovery - Dark brown sand, fine grained, micaceous, moist, odor			
-25 0.1			Same as above	Hollow stem auger terminal depth = 26'		



# MONITORING WELL LOG: S-308

Page 1 of 1

PROJECT:	Sunoco-Philadelphia Refinery	DRILLING CO.:	Total Quality Drilling
SITE LOCATION:	AOI-2	DRILLING METHOD:	Hollow Stem Auger
JOB NO.:		SAMPLING METHOD:	Split Spoon
LOGGED BY:	S. Sykes	SCREEN/RISER DIAMETER:	4"
DATES DRILLED:	4/30/10	WELLBORE DIAMETER:	6"
TOTAL DEPTH:	20'	ELEVATION:	N/A

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0.0			BC = 12-15-10-6, Full recovery - Gravel, brown/orange sandy silt, dry, no odor, very compact	Hand cleared to 8'		
0.0			Gravel, rocks, sandy silt, light brown (all fill)	Sample collected from (1'-2') submitted to the laboratory for analysis	5' PVC Riser Bentonite 3-4'	
-5					Sand 4-20'	
0.0			BC = 6-5-5-4, Full recovery - Brown, fine sandy silt, trace/some clay content, moist, increased sand with depth, slightly micaceous			
0.0			BC = 8-6-4-6, Full recovery - (10') Same as above, little to no clay content, increased sand		15' PVC Screen	
-10			(11') Same as above, fine-med. silty sand, moist, some gravel			
27.1			BC = 10-12-8-10, Full recovery - (12') Brown/black fine-med. sand, trace silt, moist (13')			
26.2			Brown/black coarse/med. sand and gravel, moist			
8.2			BC = 8-10-10-12 - (14') Brown/black fine-med. sands and gravel, moist (15') Dark gray/brown/red/white sands and gravels (coarse), moist			
0.0			BC = 14-10-8-8, 25% recovery - Same as above			
0.0			BC = 10-8-6-6, 25% recovery - Same as above			
0.0				Hollow stem auger terminal depth = 20'		
-20						



# MONITORING WELL LOG: S-309

Page 1 of 1

PROJECT:	Sunoco-Philadelphia Refinery	DRILLING CO.:	Total Quality Drilling
SITE LOCATION:	AOI-2	DRILLING METHOD:	Hollow Stem Auger
JOB NO.:		SAMPLING METHOD:	Split Spoon
LOGGED BY:	S. Sykes	SCREEN/RISER DIAMETER:	4"
DATES DRILLED:	4/29/10	WELLBORE DIAMETER:	6"
TOTAL DEPTH:	20'	ELEVATION:	N/A

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0.0			BC = 6-18-16-14, 25% Recovery - Gravel, black/brown sandy silt, dry, no odor	Hand cleared to 8'		
0.0			Gravel, rocks, sandy silt, dark brown/gray, water @ 6', all fill	Sample collected from (1'-2') submitted to the laboratory for analysis	5' PVC Riser Bentonite 3-4'	
-5					Sand 4-20'	
0.0			BC = 2-2-3-1, Full recovery - Brown/gray sandy silt, slightly micaceous, color change to all gray at bottom, no odor, moist			
0.0						
-10			BC = 1-1-2-2, Full recovery - Gray (brown streaks), fine sand and silt, trace clay, slightly micaceous, very moist/wet, no odor		15' PVC Screen	
0.0						
4.2			BC = 2-2-5-7 - Fine sandy silt, increased sand content, dark gray to black at bottom, slight odor, very moist, slightly micaceous			
8.6						
91.6			BC = 3-3-5-5, 75% recovery - (14') fine sandy/silty clay, brown/gray, very moist/wet (15') fine to medium sands, reddish brown, some clay/silt content, wet, strong odor			
-15			BC = 5-7-9-9, Full recovery - (16') same as above (17') coarse sand and gravels, sheen on spoon, wet, strong odor			
717						
783			BC = 2-2-3-5, 10% recovery - Same as above, less gravel, increased fine sand			
1298						
14.6						
7.8				Hollow stem auger terminal depth = 20'		
-20						



# MONITORING WELL LOG: S-310

Page 1 of 1

PROJECT:	Sunoco-Philadelphia Refinery	DRILLING CO.:	Total Quality Drilling
SITE LOCATION:	AOI-2	DRILLING METHOD:	Hollow Stem Auger
JOB NO.:		SAMPLING METHOD:	Split Spoon
LOGGED BY:	S. Sykes	SCREEN/RISER DIAMETER:	4"
DATES DRILLED:	4/30/10	WELLBORE DIAMETER:	6"
TOTAL DEPTH:	20'	ELEVATION:	N/A

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0.0			0'-2' Sample - no description	Hand cleared to 8'		
0.0			Cleared to 8' - Gravel, rocks (fill) and sandy silt, dark brown, water @ 4'	Sample collected from (1'-2') submitted to the laboratory for analysis	5' PVC Riser Bentonite 3-4'  Sand 4-20'	
517			BC = 6-4-6-5, 25% recovery - Brown/gray silty fine sand, trace clay, strong odor, moist			
2300						
-10			BC = 9-15-11-11, no recovery, wet		15' PVC Screen	
			BC = 8-8-6-6, 10% recovery - Medium brown silty med. sands, trace clay, wet			
366			BC = 5-5-3-8, 50% recovery - (14') gray fine sand, some clay, moist, odor (14.5') brown sandy silt, trace clay, moist, odor (15') gray coarse sand and gravels, very moist, sulfur odor, trace clay			
-15			BC = 15-17-16-13, 100% recovery - (16') Brown silty sand and clay, wet, strong odor (17') gray/white coarse sand and large gravels, wet, strong odor			
1762			BC = 3-6-7-10, 100% recovery - Brown silty fine sand and clay, wet, slight odor, small gravel throughout with large gravel in bottom of spoon	Hollow stem auger terminal depth = 20'		
17.6						
10.2						
-20						



# MONITORING WELL LOG: S-311

PROJECT: Sunoco-Philadelphia Refinery

DRILLING CO.:

Parratt Wolff

SITE LOCATION: AOI - 2 near tank 152

DRILLING METHOD:

Hollow Stem Auger

JOB NO.:

SAMPLING METHOD:

Split Spoon

LOGGED BY: JR Williams

SCREEN/RISER DIAMETER:

4"

DATES DRILLED: 5/18/2010

WELLBORE DIAMETER:

6"

TOTAL DEPTH: 33'

ELEVATION:

N/A

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0				Hand cleared to 8'		
7.8			80% Recovery - Black, silty sand, no odor, moist, stained with SPH, some small gravel			
11.8			Gravel, rocks (fill), gray sand, brick, wood			
-5			Brown, silt, sand, and gravel, water entering at 6'		20' PVC Riser	
49.4			40% recovery - Black SPH stained, clay fine sand with medium gravel, wet, odor (9')		Bentonite 13-15'	
5.1			sand clay medium with medium to large gravel		Sand 15-33'	
-10			30% recovery - Black, coarse sand with medium to large gravel, odor, moist, gravel is evenly spread, staining (11')			
7.4			Brown, coarsing downward			
7.8			40% recovery - Brown, fine to medium sand with small to large gravel, dry, odor, gravel spread throughout			
6.6						
7.2			60% recovery - Brown to gray, fine sand with medium gravel, dry, no odor, coarsing downward (15') Gray coarse sand with gravel mixed			
5.5						
-15						
6.7						



# MONITORING WELL LOG: S-311

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
			0% recovery			
4.8			70% recovery - Brown sand with small gravel, odor, moist, black staining throughout, moist, area of gray sand at bottom (19') Brown, clay with small gravel, moist, odor			
5.0						
-20 32.7			80% recovery - Same as above (21') Coarse sand with small to medium gravel, mixed in color, moist, odor, micaeous		15' PVC Screen	
20.4						
24.8			80% recovery - Same as above, layer of red sand (23') Hit water, coarse sand with small to medium gravel, mixed in color, wet, odor, micaeous, mostly gray			
1552						
80.2			40% recovery - Brown, medium sand with small to large gravel, wet, odor, SPH sheen on spoon (25') Grayish brown, coarse sand with small to large gravel	Hollow stem auger terminal depth = 34'		
-25 120						
497			80% recovery - Same as above (27') Less gravel			
213						
497			100% recovery - Grayish brown, medium to coarse sand with small to large gravel throughout, wet, odor			
428						
-30 167			40% recovery - Same as above			
446						
74.8			Recovery - Same as above, larger gravel at bottom			
225						



# MONITORING WELL LOG: S-312

Page 1 of 1

PROJECT: Sunoco-Philadelphia Refinery

DRILLING CO.:

Parratt Wolff

SITE LOCATION: AOI-2

DRILLING METHOD:

Hollow Stem Auger

JOB NO.:

SAMPLING METHOD:

Split Spoon

LOGGED BY: S. Sykes

SCREEN/RISER DIAMETER:

4"

DATES DRILLED: 4/28/10

WELLBORE DIAMETER:

6"

TOTAL DEPTH: 20'

ELEVATION:

N/A

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0.0			50% Recovery - gravel, light brown to dark brown sandy silt, dry, no odor	Hand cleared to 8'		
0.0			Brown, sandy, clayey gravel, wet, no odors. Water @ 3'	Sample collected from (1'-2') submitted to the laboratory for analysis	5' PVC Riser Bentonite 3-4'  Sand 4-20'	
-5						
357			Full recovery - Black/gray clayey (fine) sand, wet, strong odor			
446						
-10			25% recovery - Same as above, gravel		15' PVC Screen	
413						
376						
263			BC=6-8-10-6, 25% recovery - black fine clayey sand, wet, strong odor			
212						
192			BC = 10-8-8-5, 25% recovery - same as above			
-15						
201						
276			BC = 10-6-10-8, 25% recovery - (16') same as above (17') black coarse sand and gravel, wet, strong odor			
301						
378			BC = 12-10-6-8, Full recovery - black coarse sand and gravel, wet, strong odor			
291				Hollow stem auger terminal depth = 20'		
-20						



# MONITORING WELL LOG: S-313

Page 1 of 2

PROJECT: Sunoco-Philadelphia Refinery  
 SITE LOCATION: AOI-2  
 JOB NO.:  
 LOGGED BY: JR Williams  
 DATES DRILLED: 5/6/2010  
 TOTAL DEPTH: 30'

DRILLING CO.: Parratt Wolff  
 DRILLING METHOD: Hollow Stem Auger  
 SAMPLING METHOD: Split Spoon  
 SCREEN/RISER DIAMETER: 4"  
 WELLBORE DIAMETER: 6"  
 ELEVATION: N/A

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0				Hand cleared to 8'		
2.6			40% Recovery - Fine sand w/gravel, dry, gray into black sandy silt, dry, odor.			
21.4			Fill: 0'-4' Dark brown sand and silt w/gravel, rock and brick. 4'-8' dark brown/gray sandy clay.			
-5					17' PVC Riser	
3.8			Brown sandy silt with gravel, moist, no odor. (9) brownish gray sandy clay, moist, odor		Bentonite 11-13'	
37.4					Sand 13-30'	
-10			70% recovery - Brown med sand w/fine gravel, moist, odor, less gravel in second foot.			
56.7			70% recovery - Brown med sand with silt, micaceous, moist, odor.			
64.5			Coarse sand, sl moist, light gray, no odor.			
22.5			70% recovery - Brown fine sandy silt, moist, micaceous, odor, sl layered, staining. (15)			
-15			Coarse sand, light gray, no odor.			
0.0						



# MONITORING WELL LOG: S-313

Page 2 of 2

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
36.7			80% recovery - Coarse sand, moist, no odor. Gravel at 17' w/sand, poorly sorted.			
0.0						
1.8			70% Recovery - Poorly sorted sand and gravel, SPH staining, multi-colored gravel, odor, wet at bottom of spoon.			
26.8						
-20			70% recovery - Brown, micaceous, silty sand, grading to poorly sorted med-coarse sands, SPH present.		15' PVC Screen	
51.8						
211						
56.9			90% Recovery - Same as above			
71.6						
20.8			20% recovery - Brownish red sand w/gravel, wet, SPH present, mulit-colored.	Hollow stem auger terminal depth = 30'		
-25						
43.2						
5.1			100% recovery - brown multi-colored med sand, wet, odor			
19.6						
7.2			100% recovery - Fining upward sand w/gravel, light gray brown, wet, odor, light greenish brown clay 29'-30'.			
0.3						
-30						



# MONITORING WELL LOG: S-314

PROJECT: Sunoco-Philadelphia Refinery

DRILLING CO.:

Parratt Wolff

SITE LOCATION: AOI-2

DRILLING METHOD:

Hollow Stem Auger

JOB NO.:

SAMPLING METHOD:

Split Spoon

LOGGED BY: S. Sykes

SCREEN/RISER DIAMETER:

4"

DATES DRILLED: 5/11/10

WELLBORE DIAMETER:

6"

TOTAL DEPTH: 30'

ELEVATION:

N/A

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
2.9			Full recovery - Gravel, dry tan/dark brown/black sand and silt	Hand cleared to 8'		
10.5			Cleared to 8' - no description	Sample collected from (1'-2') submitted to the laboratory for analysis		
-5						
3.4			Full recovery - (8') Light gray fine sand, trace clay, moist (9') Fine sand, brown, trace clay			
123						
-10			25% recovery - Same as above		15' PVC Riser	
221						
232						
191			Full recovery - (12') Same as above (13') Brown medium sands, moist, slight odor		Bentonite 13-14'	
162						
356			50% recovery - Brown/red medium sands and coarse gravel, trace clay, moist, slight odor		Sand 14-30'	
-15						
262						
277			Full recovery - (16') Same as above (17') Brown/red/white coarse sands and gravels, strong odor			
900						
1080			Full recovery - Same as above			
1340						
-20						
1215			75% recovery - Same as above, SPH on spoon		15' PVC Screen	
1316						



# MONITORING WELL LOG: S-314

Page 2 of 2

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
1109		50% recovery - Same as above, SPH on spoon				
834						
1034		25% recovery - Brown/red/whitie mixed sands and some gravel, wet, strong odor				
-25 372						
181		Full recovery - Same as above				
183						
199		Full recovery - Same as above, some green tinted segments of sand				
25.1				Hollow stem auger terminal depth = 30'		
-30						



# MONITORING WELL LOG: S-315

Page 1 of 2

PROJECT: Sunoco-Philadelphia Refinery

DRILLING CO.:

Parratt Wolff

SITE LOCATION: AOI-2

DRILLING METHOD:

Hollow Stem Auger

JOB NO.:

SAMPLING METHOD:

Split Spoon

LOGGED BY: S. Sykes

SCREEN/RISER DIAMETER:

4"

DATES DRILLED: 5/10/10

WELLBORE DIAMETER:

6"

TOTAL DEPTH: 30'

ELEVATION:

N/A

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0				Hand cleared to 8'		
2.1			Gravel, dry tan/dark brown sand and silt	Sample collected from (1'-2') submitted to the laboratory for analysis		
87.3			Gravel, rock, brick, dark brown silt and sand (all fill)			
-5						
4.5			50% recovery - Medium gray, fine sands, trace clay, moist			
5.6						
-10					15' PVC Riser	
88.6			Full recovery - (10') Same as above, increased clay content, color change to brown (11')			
179			Brown clay and fine sand, very moist, odor			
20.0			Full recovery - (12') Same as above, brown/gray (13')			
258			Increased sand content, trace clay, brown, very moist, odor		Bentonite 13-14'	
15.0			50% recovery - (14') Same as above (15') Red/white/tan coarse sands and gravels (mixed)		Sand 14-30'	
-15						
9.2						
57.5			Full recovery - Same as above			
18.5						
154			Full recovery - (18') Same as above (19') Same as above, less gravel, strong odor			
1548						
-20					15' PVC Screen	
1311			50% recovery - Same as above, wet, strong odor, dark brown/white sand and mixed gravels			
1318						



# MONITORING WELL LOG: S-315

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
977		Full recovery - (22') Same as above, trace silt (23')				
670		Tan/golden brown medium sands, wet, odor				
913		Full recovery - (24') Same as above (25') Red/brown/white mixed sands and gravels, wet, strong odor				
510		Full recovery - Gray/red/white mixed sands and gravels, wet, odor				
400		Full recovery - Same as above				
191						
356						
171						
-30				Hollow stem auger terminal depth = 30'		



# MONITORING WELL LOG: S-316

PROJECT: Sunoco-Philadelphia Refinery

DRILLING CO.:

Parratt Wolff

SITE LOCATION: AOI-2

DRILLING METHOD:

Hollow Stem Auger

JOB NO.:

SAMPLING METHOD:

Split Spoon

LOGGED BY: S. Sykes

SCREEN/RISER DIAMETER:

4"

DATES DRILLED: 5/10/10

WELLBORE DIAMETER:

6"

TOTAL DEPTH: 30'

ELEVATION:

N/A

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
47.5			Full recovery - Gravel, fill, gray/tan to black/dk. brown coarse sand and silt, dry	Hand cleared to 8'		
68.6			Gravel, bricks, rocks, dark brown silt and sand (all fill)	Sample collected from (1'-2') submitted to the laboratory for analysis		
-5						
3.7			25% recovery - Brown/black/red coarse sand and gravel, wet			
6.9			Little recovery - Same as above		15' PVC Riser	
-10						
6.8			30% recovery - Orange/brown and black coarse sand and gravels, wet, no odor			
8.6					Bentonite 13-14'	
163			50% recovery - (14') Same as above (15') Dark brown/gray sandy clay, trace silt, wet, odor		Sand 14-30'	
-15						
197			25% recovery - Gray fine sand, trace clay, wet, odor - Spoon refusal @ 18' (augered through)			
232			50% recovery - (18') Same as above (19') Gravel/wood			
189						
76.0						
-20						
80.0			Full recovery - Large gravel and wood, wet		15' PVC Screen	
76.6						
93.1			Full recovery - Same as above with some fine sands, wet, odors			
333						
85.0			Full recovery - Dark gray/trace brown fine to medium sand and coarse gravels, wet, odor			
-25						
375			Full recovery - Dark gray to black coarse sand and gravel, wet, odor			
201			Full recovery - (28') Same as above (29') dark gray/red fine sand and gravels, wet, odor			
295						
234						
212				Hollow stem auger terminal depth = 30'		
-30						



# MONITORING WELL LOG: S-317

Page 1 of 2

PROJECT: Sunoco-Philadelphia Refinery

DRILLING CO.:

Parratt Wolff

SITE LOCATION: AOI-2

DRILLING METHOD:

Hollow Stem Auger

JOB NO.:

SAMPLING METHOD:

Split Spoon

LOGGED BY: JR Williams

SCREEN/RISER DIAMETER:

4"

DATES DRILLED: 5/7/2010

WELLBORE DIAMETER:

6"

TOTAL DEPTH: 30'

ELEVATION:

N/A

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0.0			80% Recovery - Brown, small gravel with fine silty sand, moist, no odor (1') Brown, fine silty sand, stained black,	Hand cleared to 8'		
0.0			Cleared to 8' - Fill: gray clay with gravel. No debris, wood or large cobbles. Dry, no odors/staining.			
-5					17' PVC Riser	
0.0			80% recovery - Brownish green, fine silty sand, moist, odor, layered with black		Bentonite 9-12'	
0.0					Sand 12-30'	
-10			70% recovery - Same as above (11') Brown, sandy silt, medium grained, moist, odor			
0.4						
1.0			Brown, medium sand, moist, no odor, coarsing downward (13') Coarse sand multi colored, moist, no odor, micaceous			
1.1						
-						
-15						



# MONITORING WELL LOG: S-317

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0.0		□ □ □ □ □	40% recovery - Multi-colored, coarse sand with large gravel, moist, odor, micaceous			
0.0		□ □ □ □ □				
0.0		□ □ □ □ □	80% recovery - Same as above			
6.8		□ □ □ □ □				
-20 223		□ □ □ □ □	50% recovery - Multi-colored, coarse sand with medium gravel, moist, odor		15' PVC Screen	
653		□ □ □ □ □				
648		□ □ □ □ □	50% recovery - Multi-colored, coarse sand with medium gravel, wet, odor, saturated with SPH			
214		□ □ □ □ □				
235		□ □ □ □ □	Brownish gray, medium-coarse sand with some medium gravel, wet, odor (25') Gray, medium sand, wet, odor	Hollow stem auger terminal depth = 30'		
-25 118		□ □ □ □ □				
42.8		□ □ □ □ □	100% recovery - Brownish gray, medium sand, wet, odor (27') some large gravel			
23.4		□ □ □ □ □				
142		□ □ □ □ □	100% recovery - Multi-colored, coarse sand with medium, wet, odor (29') Olive green, sand compacted with layers of red sand throughout, moist, odor			
5.8		□ □ □ □ □				
-30		□ □ □ □ □				



# MONITORING WELL LOG: S-318

Page 1 of 2

PROJECT: Sunoco-Philadelphia Refinery  
 SITE LOCATION: AOI-2  
 JOB NO.:  
 LOGGED BY: JR Williams  
 DATES DRILLED: 5/12/2010  
 TOTAL DEPTH: 30'

DRILLING CO.: Parratt Wolff  
 DRILLING METHOD: Hollow Stem Auger  
 SAMPLING METHOD: Split Spoon  
 SCREEN/RISER DIAMETER: 4"  
 WELLBORE DIAMETER: 6"  
 ELEVATION: N/A

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0				Hand cleared to 8'		
28.3			80% Recovery - Greenish brown, medium sand with large gravel, dry, odor			
20.7			Cleared to 8' - Fill: Dry sandy gravel.			
-5					17' PVC Riser	
84.5			70% recovery - Grayish brown, clay sand with small gravel, odor, moist		Bentonite 10-13'	
107					Sand 13-30'	
-10			70% recovery - Brown, medium sand, micaceous, moist, odor			
139						
7.9						
13.5			100% recovery - Brown, medium sand, micaceous, black staining throughout, few medium gravel, moist, odor			
9.6						
4.0						
-15						
6.5						



# MONITORING WELL LOG: S-318

Page 2 of 2

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
3.4		☒ ☒ ☒ ☒ ☒	100% recovery - Same as above (15') Brown, coarse sand with medium to large gravel, dry, coarsing downward to greater amounts of gravel			
5.4		☒ ☒ ☒ ☒ ☒				
14.5		☒ ☒ ☒ ☒ ☒	70% recovery - Brown, coarse sand with medium to large gravel, moist, odor			
27.2		☒ ☒ ☒ ☒ ☒				
-20 17.0		☒ ☒ ☒ ☒ ☒	50% recovery - Brown gray, coarse sand with large gravel, wet, odor (21') Gray		15' PVC Screen	
30.4		☒ ☒ ☒ ☒ ☒				
28.6		☒ ☒ ☒ ☒ ☒	100% recovery - Same as above (23') Brownish red, medium sand, wet, odor, sand has multi-colored grains in it			
55.1		☒ ☒ ☒ ☒ ☒				
66.5		☒ ☒ ☒ ☒ ☒	80% recovery - Coarse sand with large gravel throughout, wet, odor (25') Brown, medium sand with areas of red throughout, wet, odor, sand has multi colored grains throughout	Hollow stem auger terminal depth = 30'		
-25 19.3		☒ ☒ ☒ ☒ ☒				
19.5		☒ ☒ ☒ ☒ ☒	80% recovery - Same as above (27') Brown, medium sand with large gravel throughout, wet, odor			
7.0		☒ ☒ ☒ ☒ ☒				
43.7		☒ ☒ ☒ ☒ ☒	100% recovery - Same as above			
14.8		☒ ☒ ☒ ☒ ☒				
-30		☒ ☒ ☒ ☒ ☒				



# MONITORING WELL LOG: S-328

PROJECT: Sunoco-Philadelphia Refinery  
 SITE LOCATION: AOI-2  
 JOB NO.:  
 LOGGED BY: Shaun Sykes  
 DATES DRILLED: 6/11/2010  
 TOTAL DEPTH: 26'

DRILLING CO.: Parratt Wolff  
 DRILLING METHOD: Hollow Stem Auger  
 SAMPLING METHOD: Split Spoon Sampling  
 SCREEN/RISER DIAMETER: 4"  
 WELLBORE DIAMETER: 6"  
 ELEVATION: N/A

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
0				Hand cleared to 8'		
-5					11' PVC Riser	
8.0			50% recovery - Brown silty sand with black staining throughout, wet, odor		Bentonite 5-8'	
18.3					Sand 8-26'	
-10			Full recovery - (10') Brown fine sand with black staining, moist, micaceous with odor (11') Coarsing downward			
31.5						
82.0			Full recovery - (12') Same as above (13') Brown medium to coarse sand, micaceous, with small gravel, moist, odor			
32.6						
9.6			70% recovery - Brown medium sand, micaceous, moist, odor, SPH sheen on soil			
-15						
68.5						
6.0			20% recovery - Brown medium			



# MONITORING WELL LOG: S-328

Page 2 of 2

Depth (feet)	OVM (ppm)	USCS	LITHOLOGY	COMMENTS	WELL CONSTRUCTION	WELL DIAGRAM
6.5			sand, micaceous, odor, SPH sheen on soil, wet, medium coarse gravel at bottom of spoon			
12.2			50% recovery - Brown fine to medium sand, micaceous, medium gravel, wet, odor, coarsing downward, SPH sheen			
44.1						
-20 54.6			50% recovery - Brown, coarse sand with small to large gravel, micaceous, wet, odor, SPH sheen on spoon		15' PVC Screen	
271						
14.3			Full recovery - Brown, medium sand, wet, micaceous, odor			
120						
			0% recovery	Hollow stem auger terminal depth = 26'		
-25						